

OCCASIONAL PAPERS
OF THE
CALIFORNIA ACADEMY OF SCIENCES

No. 30, 10 pages, 2 figures, 1 plate.

August 31, 1961

THE IMMATURE STAGES OF *CALLOMYIA*,
WITH THE DESCRIPTION OF A NEW SPECIES
OF THIS GENUS (DIPTERA: PLATYPEZIDAE)

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On March 27, 1954, James J. Gillogly, young son of Lorin R. and Gwendolyn Gillogly, was on a field trip in the hills north-east of Oakland, California, with his parents and his brother Alan when he discovered the first larva of the genus *Callomyia* to be recorded for the New World. In fact, only three previous collections of the immature stages of callomyias are mentioned in the literature. All three records are from Europe. They are summarized by Lundbeck (1927) as follows: one collection by Schnabl of *Callomyia amoena* reared from an unidentified fungus growing on *Alnus*, a collection by de Meijere in July of the larvae of the same fly in an unidentified fungus growing on a fallen tree trunk, and the collection in September by himself of a larva of an undetermined species of *Callomyia* from a species of *Corticium*.

At the time James Gillogly made his discovery, he and the other members of his family were engaged in stripping loose bark from dead, fallen pine trees. The lone larva was found attached to the inside of the bark where there was growing an abundance of white fungus mycelium, such as is shown with the pupa illustrated in the upper part of plate I. The fallen tree from which the bark was taken (fig. 1) was found lying in a damp nook shaded by eucalyptus trees. It had fallen across a narrow gully which, at the time, had a four-inch-wide stream flowing beneath it. The diameter of the trunk where the larva was obtained was approximately two feet.

The Gilloglys were much impressed by the intricate pattern of the marginal spines of this creature which transformed into a pupa within a few hours after it had been collected (plate 1). Accordingly they made a sketch of it which they showed to Dr. Robert L. Usinger of the University of California. He referred them to the book on dipterous larvae by Hennig (1952) where they found an illustration which resembled their specimen. Hennig had used Meigen's 1800-name *Cleona* which is a synonym for *Callomyia*. The pupa was subsequently exhibited at a meeting of the Pacific Coast Entomological Society at which time Mr. Hugh B. Leech of the California Academy of Sciences told the Gilloglys that I was working on the Platypezidae and would be much interested in their find. As a result they contacted me and informed me of their activities.

In the meantime the Gilloglys had made a second collection, this time including pupae as well as larvae. These specimens were obtained on April 24, again in the Oakland hills but more than a mile north of the first locality. The weather was damp and characterized by a sprinkling mist according to the Gillogly field notes. Many of the comments given below are taken from or based on these notes.

This second collection consisted of 43 specimens although many more were left on the log. It was a fallen, rotted log, in a small clearing, grassy and well drained, but this time with no stream nearby. Young Monterey pines were growing in the vicinity. No bark remained on the top of the log; that of the underside showed that the tree had been burned. This log was about 15 inches in diameter. It was so rotten that when it was turned over it broke in half. It was very damp on what had been the underneath surface, with fungi and mats of white mycelium abundant. Many pupae were located directly on the rotten wood, facing the bark. The surface was "just alive with them, as many as 20 larvae and pupae within a 5-inch square." The 43 specimens taken consisted of 10 larvae, 27 pupae, and 6 empty pupal cases, the last indicating that some of the flies had already emerged by this date.

The larvae ranged from 2 to 5 mm. in length, the average being about 4.5 mm. The smallest larva was nearly white in color, whereas most were pale beige-grey, and the largest was dark grey. The larvae were observed to crawl very slowly; in one case progress was less than an inch in an entire morning.

The pupae ranged from 4 to 5 mm. in length. They were brownish grey in color. Because the larvae pupate in their last-instar skin, the pupae and larvae were very similar in appearance.

A third collection was made by the Gillogly family on May 1. This time they were accompanied by Mr. Glen Cagley. They obtained a large series of larvae and pupae from the same locality as for the April 24 collection, many of them coming from the same log. These specimens were sent to me for study, photography, and rearing.



Figure 1. The fallen pine tree from which James Gillogly took the first larva of *Callomyia gilloglyorum*.

The Gilloglys placed five of their pupae in a dry vial for observation. These were individuals which had flipped from the bark when it had been pulled away from the log. The rest of their larvae and pupae they placed in a special rearing box, but no adults were obtained from these. Of the five pupae in the vial, one emerged on October 5. This male was sent to me and is included in the type series of the new species described below. From the material of the third collection I reared only eight flies, four males and four females. One of these females is the allotype. She emerged on August 15, but the other females and the males did not make their appearance until November 9. The holotype is one of these.

No additional specimens belonging to this new species have been obtained although I have carried on intensive platypezid collecting in western North America and particularly in California, and have searched the type locality in vain. In recognition of the deep interest which the Gilloglys have all shown in entomology, and in sincere appreciation of the important contribution which collectively they have made to our knowledge of the flat-footed flies by locating and turning over to me the first recognized *Callomyia* larvae and pupae to be recorded from the New World, I name this new species in their honor.

Callomyia gilloglyorum Kessel, new species.

(Plate I, text fig. 2.)

HOLOTYPE. Male. California Academy of Sciences, from the Oakland hills Alameda County, California, collected as a larva on May 1, 1954 by the Lorin Gillogly family. It emerged November 9, 1954. *General appearance:* Blackish brown, with silvery grey markings on the thorax and the sides of the anterior abdominal segments; wings brownish, without stigmata. *Length* 4 mm. *Head:* Face grey; proboscis and palpi yellowish; occiput black; all bristles black except on the proboscis and palpi where they are golden or brownish; antennae black, with first two segments short, subequal, as broad as long; first antennal segment with one small bristle above; second segment with subequal bristles, two above and two below; third segment somewhat flattened and about half again as long as the first two together, pointed at the apex and covered with short fine hair; arista bare, terminal, about 3 times as long as the third segment. Eyes contiguous for about 10 facets, divided by a shallow groove at the level of the antennae into an upper region with larger facets and a lower portion consisting of smaller facets; ocelli glassy; ocellar tubercle jet black and prominent. Chief cephalic bristles: one pair of prominent, divergent greater ocellars arising close together at the level of the anterior margin of the lateral ocelli; a single pair of lesser ocellars, divergent and about one-half the length of the greater ocellars, arising from the posterior margin of the ocellar tubercle; one pair of minute frontorbitals, divergent, situated in the margins of the eyes some 6 facet-lengths in front of the point of contiguity;

verticals, occipitocentrals, and occipitolaterals absent; postorbitals stout, uppermost ones somewhat curved forward over the eyes, lower ones becoming straighter and more slender as they pass down the paracephalic regions to the cheeks; 2 or 3 indistinct rows of paracephalics on each side, located behind and more or less parallel to the postorbitals. *Thorax* black above except for silvery grey along the posterior margin of the mesonotum; mesopleura also silvery grey; scutellum black, squamae yellowish grey, fringed with brownish hairs; all bristles black; one row of 7 acrosticals, the row abbreviated somewhat in front and stopping behind about halfway back on the mesonotum; a row of 14 dorsocentrals on each side, consisting of about 5 presutural and 9 postsutural bristles, the row curving outward in front at the level just anterior to the first acrostical and extending uninterrupted to the humeral callus, extending some 3 bristles behind the last acrostical, the posterior bristles of the row becoming much larger with the last one (prescutellar) very large, 1 humeral in line with and about equal in size to the outward-turned dorsocentrals; no posthumeral; 2 additional presutural bristles posterior to the outward-turned dorsocentrals, consisting of a larger supraalar behind and a smaller intraalar in front; 1 large postsutural intraalar; 1 large postalar; 5 notopleurals arranged 3 below and 2 above; scutellum bare except for 2 pairs of prominent, marginal, and convergent scutellars; 2 pairs of propleurals just above the articulation of the front coxae. *Wings* smoky, without stigmata, 10 spines on vein R₁. Halteres with yellowish stems and brownish knobs. *Legs* slender, brownish yellow; front femora with a prominent curved oxhorn bristle arising from the posterior margin near the base and reaching almost to the middle of the segment; posterior tibiae only moderately expanded at the distal end; posterior metatarsus rounded but only moderately expanded. *Abdomen* brownish black with obvious large silver-grey markings on the sides of the first four segments; venter yellowish; dorsum and sides clothed with numerous slender black hairs becoming thicker behind; venter with a few slender hairs.

ALLOTYPE. Female. California Academy of Sciences, from Oakland hills, Alameda County, collected as a larva on May 1, 1954, by the Lorin Gillogly family. This fly emerged on August 15. *General appearance*: Mostly grey but with abdomen banded with black; wings clear, legs yellowish. *Length* 4 mm. *Head*: Face and front brownish grey; proboscis and palpi orange yellow; occiput grey; all bristles black except those on the proboscis which are brownish; all segments of the antennae brownish black; first two antennal segments short, as broad as long, subequal, first segment with a small dorsal bristle, second segment with a ring of prominent bristles; third segment somewhat flattened, about as long as the first two combined, pointed at the apex, covered with short fine hair; arista black, bare, and terminal. Eyes widely separated, not divided by a groove as in the male, all facets of equal size; ocelli amber; ocellar tubercle brownish black. Chief cephalic bristles: 1 pair of promi-

nent and divergent greater ocellars arising at the level of the anterior margins of the lateral ocelli; 1 pair of prominent divergent vertical bristles equal in size to the greater ocellars, located at the level of the lateral ocelli; 1 pair of occipitocentrals, convergent, about two-thirds the length of the verticals, located toward the midline but well behind them; 1 pair of slightly convergent occipitocentrals behind and lateral to the verticals and in line with and at the sides of the occipitocentrals, about two-thirds the length of the occipitocentrals, the first postorbital on each side standing close and parallel thereto; the postorbitals not curving over the eyes and not becoming more slender as they pass down the paracephalic region to the cheeks; 2 or 3 indistinct rows of prominent paracephalics, located behind and more or less parallel to the postorbitals; 1 pair of prominent pronoorbitals, about the size of the greater ocellars; 3 pairs of tiny frontals below and turned toward the midline from the frontoorbitals, the middle one being the longest. *Thorax* silvery grey with faint brownish vittae on the mesonotum; squamae creamy white, fringed with golden hairs; all bristles black; 1 row of about 12 acrosticals set close together and extending down the midline, the row abbreviated somewhat in front and stopping behind far in advance of the scutellum; 1 row on each side of about 17 dorsocentrals, consisting of about 8 presutural and 9 postsutural bristles, the row curving outward in front at a level just anterior to the first acrostical and extending uninterrupted to the humeral callus, extending some 3 bristles behind the last acrostical, the posterior bristles of the row becoming much larger, with the last one (prescutellar) very large; 2 humerals in line with the outward-turned dorsocentrals, about equal in size; no posthumerals; 3 additional presutural bristles posterior to the outward-turned dorsocentrals, consisting of an outer large supraalar and 2 inner intraalars arranged in line, the anterior of the two small, but the posterior one about the size of the supraalar; 1 large postsutural supraalar; 4 postsutural intraalars, the last being twice the length of the others; 3 postalars, the middle one very large and the others minute; 7 notopleurals arranged 3 in a row below and 4 above, with the last two of the upper row considerably larger; scutellum bare except for 2 pairs of prominent marginal scutellars which are convergent; 1 pair of propleurals just above the articulation of the front coxae. *Wings* clear, without stigmata, 14 spines on vein R_1 . Halteres with yellowish stems and brownish knobs. *Legs* slender, yellowish, posterior tibiae and tarsi not much dilated. *Abdomen* silvery grey with jet-black markings on segments 3 and 5, both above and at sides, with a similarly colored mid-dorsal black line on segment 4; venter creamy yellow; dorsum and sides of abdomen with scattered slender hairs, these becoming distinct bristles on the terminal segments.

PARATYPES. Four males and 3 females, all topotypical and collected as larvae by the L. Gillogly family. One male emerged on October 5, and the rest of the flies on November 9. There is some variation from the abdominal markings of the holotype exhibited among the paratype males, the sides of

the fifth segment, as well as the first four segments, showing silvery grey areas in two of the flies. The female paratypes are in general accord with the allotype, the chief difference being that they have 6 instead of 7 notopleurals.

COMPARISON. At first sight the male of *Callomyia gilloglyorum* may be confused with the male of *C. calla*. They may easily be distinguished, however, by the markings of the thorax and abdomen. In *C. gilloglyorum* the thorax is black and grey above, whereas in *C. calla* it is only black above. In *C. gilloglyorum* there are silvery grey markings at the sides of the anterior abdominal segments. In *C. calla* the markings in this area are yellowish. The female of *C. gilloglyorum* is very different from any of our known *Callomyia* species. With her somber black and grey markings, she lacks the bright orange, yellow, or blue colors characteristic of the females of other species of her genus.

LARVAE AND PUPAE. The structure of the larvae and pupae of *C. gilloglyorum* agrees with the descriptions of the corresponding stages of *C. amoena* given by de Meijere (1901) although my interpretation of the segmentation goes beyond that of his presentation. The general shape of the larva, as well as that of the puparium which is produced from the skin of the last larval instar, is a broad oval (plate 1), with the anterior and posterior ends equally rounded. Nine apparent segments are evident in dorsal view. The body is not flat, but



Figure 2. Ventral view of the larva of *Callomyia gilloglyorum*.

is thicker toward the midline. The larva is extraordinary in its appearance not only because of the large number (48) of marginal processes which it possesses, but also because of the intricate pattern of these processes. While *Platypeza* and *Calotarsa* typically have a single pair of marginal processes per segment, *Callomyia* has a minimum of two pairs. In *Platypeza* and *Calotarsa* these are simple processes, but in *Callomyia* each one of them possesses four to seven pairs of side processes which give the filament a very intricate outline.

Of the nine dorsally visible apparent segments which occur in the larva and pupa of *Callomyia*, the first two have four pairs of processes each, the next six segments have two pairs each, and the ninth possesses four pairs of filaments. This last apparent segment has the anal opening on its lower surface and the paired posterior spiracles arising near the anterior margin above.

Although the segmentation is less distinct on the ventral surface (fig. 2), an examination of this area in the living larva reveals the head and the first body segment (prothorax) turned under so as to be hidden from above. In the figure these areas are somewhat contracted and consequently are not apparent in this ventral view. The head bears the antennae and mouthparts. The prothorax has on its anterior margin a pair of sclerotized rounded elevations containing the openings of the anterior pair of spiracles.

Reference has been made to the fact that the apparent nine segments which are visible in dorsal view do not all have the same number of marginal processes, the typical number being two pairs. It may be presumed that those apparent dorsally visible segments, viz. the first, second, and last, which possess more than this number, are in reality composite segments. Because each possesses four pairs of filaments we may conclude that each of these apparent segments bears the filaments belonging to two primitive segments.

On this basis the anterior segmentation of the larva of *Callomyia* may be interpreted as follows: The ventrally directed head and prothorax are followed by the mesothorax which is the first dorsally visible segment. The two middle pairs of filaments which seem to arise from its anterior margin actually belong to the prothorax. The second apparent dorsally visible segment is a true composite of two primitive segments as de Meijere (1901) has already proposed. In addition to the evidence provided by the double number of marginal filaments, the fact that this second apparent segment as seen from above is somewhat larger than its fellows, supports this conclusion. Still more evidence comes from the transverse rows of small bristles which are located on the dorsal surface. This second apparent segment not only has the row of six bristles along its posterior margin as do the next five segments, but it

PLATE 1

Dorsal views of pupae of *Callomyia gilloglyorum*.



